



## **CITY OF ROANOKE OFFICE OF THE CITY MANAGER**

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October 17, 2005

Honorable C. Nelson Harris, Mayor  
Honorable Beverly T. Fitzpatrick, Jr., Vice Mayor  
Honorable Dr. M. Rupert Cutler, Council Member  
Honorable Alfred T. Dowe, Jr., Council Member  
Honorable Sherman P. Lea, Council Member  
Honorable Brenda L. McDaniel, Council Member  
Honorable Brian J. Wishneff, Council Member

Dear Mayor Harris and Members of City Council:

Subject: Regional Pre-disaster Mitigation  
Plan

### **Background:**

The Disaster Mitigation Act of 2000 requires that local governments, as a condition of receiving federal disaster mitigation funds, have a mitigation plan that describes the process for identifying hazards, risks and vulnerabilities, identifies and prioritizes mitigation actions, encourages the development of local mitigation and provide technical support for those efforts. The Roanoke Valley – Alleghany Regional Commission received a grant from the Virginia Department of Emergency Management (VDEM) to develop a regional predisaster mitigation plan meeting these requirements. In collaboration with staff from the localities, a final draft plan has been completed. Such plan has been approved by the Federal Emergency Management Agency (FEMA) and VDEM. Each locality is asked to adopt the global portions of the plan as well as their locality specific section. An Executive Summary of the plan, dated September 2005, is attached. Also attached is the City of Roanoke specific section of the plan.

Adoption of this plan does not require the appropriation of City funds at this time, nor does it commit the City to completion of any specific projects. The plan indicates that all goals are dependant on the availability of non local funding. However, should a specific project be undertaken requiring a local match to state or federal funds, funding would be addressed at that time.

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Recommended Action:

City Council adopt the Regional Predisaster Mitigation Plan referred to above and authorize the City Manager to take such actions as may be needed to implement and administer such Plan.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Darlene L. Burcham".

Darlene L. Burcham  
City Manager

DLB: jac

c: Mary F. Parker, City Clerk  
William M. Hackworth, City Attorney  
Jesse A. Hall, Director of Finance  
Paul Truntich, Environmental Administrator  
Joe Coyle, Coordinator of Emergency Management

CM05-00154

## EXECUTIVE SUMMARY

The Disaster Mitigation Act of 2000 (DMA 2000) requires that local governments, as a condition of receiving federal disaster mitigation funds for Presidential Disaster Declarations, have a mitigation plan that describes the process for identifying hazards, risks and vulnerabilities, identifies and prioritizes mitigation actions, encourage the development of local mitigation and provide technical support for those efforts. The Roanoke Valley-Alleghany region has had eleven (11) Presidential Disaster Declarations since 1969.

The Federal Emergency Management Agency (FEMA) defines *Mitigation* as any sustained action taken to reduce or eliminate long-term risk to life and property from a hazard event. Mitigation, also known as prevention, encourages long-term reduction of hazard vulnerability. The goal of mitigation is to save lives and reduce property damage. Mitigation can accomplish this, and should be cost-effective and environmentally sound. This, in turn, can reduce the enormous cost of disasters to property owners and all levels of government. In addition, mitigation can protect critical community facilities, reduce exposure to liability, and minimize community disruption. Examples include land use planning, adoption of building codes, and elevation of homes, or acquisition and relocation of homes away from floodplains.

It has been demonstrated time after time that hazard mitigation is most effective when based on an inclusive, comprehensive, long-term plan that is developed before a disaster actually occurs. However, in the past, many communities have undertaken mitigation actions with good intentions but with little advance planning. In some of these cases, decisions have been made "on the fly" in the wake of a disaster. In other cases, decisions may have been made in advance but without careful consideration of all options, effects, and/or contributing factors. The results have been mixed at best, leading to less than optimal use of limited resources.

The purpose of this plan is to fulfill local Pre-Disaster Mitigation Plan requirements. The plan will identify hazards; establish community goals and objectives and select mitigation activities that are appropriate for the Roanoke Valley-Alleghany Region.

## **Planning Area**

The Regional Pre-Disaster Mitigation Plan affects unincorporated areas, towns, cities and counties within the Roanoke Valley-Alleghany Regional Commission service area. While the plan does not establish any legal requirements for the localities, it does provide a framework for planning for natural hazards.

The localities addressed in this plan include: the counties of Alleghany, Botetourt, Craig and Roanoke; the cities of Covington, Roanoke and Salem; and the towns of Buchanan, Clifton Forge, Fincastle, Iron Gate, New Castle, Troutville and Vinton.

## **Hazards**

The natural hazard most likely to affect the Roanoke Valley-Alleghany region is widespread *flooding* or flash flooding. Watersheds in the Roanoke Valley-Alleghany region are typical of the Blue Ridge region in which smaller streams collect water which then flows through steep terrain, picking up velocity, and into the valleys and flatlands along major rivers where development has occurred.

In the Roanoke Valley *wildfires* are second only to flooding as the greatest recurring natural hazard. In 1999, Fort Lewis Mountain in the western part of Roanoke County burned out of control for a week, destroying land and endangering homes before it was brought under control.

The area is frequently subjected to *winter storms*, heavy thunderstorms, tropical storms, *hurricane* remnants, *landslides*, *karst* and occasional *tornado*. Meteorological events have the potential to impact all communities and structures in the Roanoke Valley-Alleghany region.

## **The Regional Mitigation Plan**

The purpose of this planning initiative is to develop a Plan that meets all State and Federal requirements. The Plan will help localities maintain their eligibility for certain future Federal funding, especially the Hazard Mitigation Grant Program. A FEMA-approved Mitigation Plan is also required to participate in the Emergency Management Performance Grant Program and in projects under the Pre- Disaster Mitigation Grant Program.

The plan outlines general actions designed to address and reduce the impact of a full range of natural hazards facing region, including such natural hazards as floods, hurricanes, winter storms and wildfires. A multi-jurisdictional planning approach was utilized. By having multiple jurisdictions work together on common hazards/risks, the planning process eliminated the need for each local jurisdiction to devise its own approach and prepare its own separate document. Further, this type of planning effort resulted in a common plan format and loss estimation technique that will help the State Department of Emergency Management and FEMA understand the area's vulnerabilities when evaluating future policies and projects.

While a single, regional plan was developed, please note that *each local jurisdiction has its own separate section as part of the overall plan.*

### **Hazard Identification**

The RVARC worked with the Regional Pre-Disaster Mitigation Plan Committee to compile data on natural hazards. Information was compiled on the occurrence of natural hazard events in the region. Hazards that affect the area were identified based on historical and other available data. Each local jurisdiction has been given an opportunity to review the hazard events data and make amendments as appropriate.

### **Risk Assessment And Loss Estimates**

RVARC assessed potential impacts from each hazard using available geographic information system (GIS) layers and government databases. Loss estimates were performed only for flooding. Other disasters are too variable and widespread to determine any useful loss estimates.

### **Mitigation Strategy Development**

Based on the findings of the risk assessment, RVARC, working with local governments, drafted an overall mitigation strategy for the region and each individual locality. During this step, goals, objectives and actions to reduce the damage from each hazard were identified for the planning area.

## **Public Participation**

Localities, state and federal agencies, and other local groups were invited to serve on the Roanoke Valley-Alleghany Regional Commission Pre-Disaster Mitigation Plan Committee. Local governments were asked to appoint the staff and/or citizens that would be the most appropriate representative(s) to the Committee and responded with a wide range of appointees: Mayors, Emergency Service Coordinators, Engineers, Planners, City and Town Managers, and fire and rescue personnel. Locality representatives attended the Committee meetings on a regular basis. Additional groups that the Committee felt would be of assistance were also invited to participate. These included local Chambers of Commerce, the local Chapter of the Red Cross, Virginia Department of Forestry, U.S. Forest Service, and the Council of Community Services. Committee meetings were held on an as needed basis at critical times in the document's development and for review of the draft and final versions of the Plan. Committee meeting agendas and attendance sheets are included in this appendix.

The public was invited to attend one or more of four open-house format workshops that were held to seek input about hazards that have impacted the area. Participants were given the opportunity to review maps, historical hazard data, damage estimates, and information about the Disaster Mitigation Act and the pre-disaster planning requirements. Information gathered at the workshops was used in developing strategies to mitigate natural hazards in the region.

Workshops were held in the early evening, two from 5 to 7 p.m. and two from 6 to 8 p.m., over a three-week period. The workshops were advertised as display ads in two daily and four weekly local newspapers. The workshops, and the mitigation plan process itself, were covered by the local newspapers, local radio news broadcasts and a local chamber of commerce newsletter. A Public Forum for review of the final draft of the Plan was held August 29, 2005 at the Roanoke Higher Education Center. Workshop announcements, sign-in sheets, news articles, brochures, and handout materials are included in Appendix A.

## **Plan Review, Adoption and Maintenance**

In accordance with Federal and State requirements, the governing bodies of each participating jurisdiction must review and approve that portion of the overall plan that affects their jurisdiction. FEMA has requested that each locality review the final version of the plan and adopt it by resolution. The plan will then be sent to the Virginia Department of Emergency Management and FEMA for review and approval.

Following FEMA approval, the plan may then be officially adopted by each locality. No changes to the plan should be made following FEMA's approval of the document. If changes are necessary, they should be noted in the resolution and addressed in the next plan update.

The Plan Maintenance section of this document, Chapter 8, details the process that will ensure that the Mitigation Plan remains an active and relevant document. The process includes a schedule for monitoring the Plan on an annual basis and producing the required plan revision every five years and describes how the localities will integrate public participation throughout the plan maintenance process.

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## CITY OF ROANOKE

### Current and Past Mitigation Measures

Floodplain Management – The City of Roanoke has adopted a Floodplain Management Ordinance that requires new residential buildings to be elevated to or above the base flood elevation. The City has a floodplain overlay district, corresponding to areas identified on Flood Insurance rate Maps prepared by FEMA.

Roanoke Valley Regional Stormwater Management Plan - All four Roanoke Valley jurisdictions participated in the development of the plan that was coordinated through the efforts of the Fifth Planning District Commission. It offers alternative solutions for both flooding and flash flooding problems. These alternatives include clearing stream channels, enlarging drainage openings, constructing regional detention facilities, and flood proofing individual structures. The plan presents a total of 138 individual projects to address flooding in the 16 watersheds. These are ranked in order of priority within each watershed but no overall ranking within the valley is presented. Cost estimates are presented for each project, but neither individual project benefits, nor cumulative benefits are discussed. It would be essential to analyze the benefits of these projects before the plan can be used as a guideline for specific activities. The identified projects would cost a total of \$66 million in 2001 dollars, not including land acquisition or efforts to flood proof or move over 2,200 buildings. A formal quantification of the corresponding benefits would go a long way toward justifying this cost, which can initially seem overwhelming to both citizens and community officials. For example, the 1997 plan reports that between 1972 and 1992, floods caused over \$200 million in damages in the valley, and resulted in 10 deaths. The plan's Financing Options Report recommends creation of a regional stormwater utility as a means of funding the identified work.

Stormwater Management - The City has a Stormwater Management Ordinance that is part of the City Code. It was developed to bring the City into compliance with state laws on stormwater management and erosion and sedimentation control.

National Flood Insurance Program – The City participates in, and is in good standing with, the National Flood Insurance Program (NFIP) by enforcing floodplain management regulations that meet federal



requirements. This program allows property owners to purchase flood insurance from NFIP. There are currently 607 NFIP policies in force in the City.

Dam Safety – Spring Hollow Reservoir Dam, located on a tributary of the Roanoke River and owned by the Western Virginia Water Authority, could impact properties in the City of Roanoke if it failed. Carvin Cove Reservoir Dam, located on a tributary of the Carvin Creek and owned by the Western Virginia Water Authority, could impact properties in the City if it failed.

Erosion and Sediment Control – The City of Roanoke has adopted the regulations, references, guidelines, standards and specifications promulgated by the Virginia Soil and Water Conservation Board (and any local handbook or publication of the board) for the effective control of soil erosion and sediment deposition to prevent the unreasonable degradation of properties, stream channels, waters and other natural resources. Such regulations, references, guidelines, standards and specifications for erosion and sediment control are included in, but not limited to, the Virginia Erosion and Sediment Control Regulations and the Virginia Erosion and Sediment Control Handbook, as amended from time to time.

IFLOWS – The City participates in a flood warning system developed by the National Weather Service called Integrated Flood Observing and Warning System (IFLOWS). Through the use of radio-transmitted information, this system provides advanced flood forecasting to the City Emergency Operation Center. There are five IFLOW stations located in the City.

Project Impact Roanoke Valley – Project Impact Roanoke Valley was a partnership of FEMA, Roanoke County, the cities of Roanoke and Salem and the Town of Vinton to reduce destruction to life and property during disasters through planning and mitigation. The Project Impact Roanoke Valley Steering Committee and its work groups evaluated hazard mitigation needs from 1998 to 2001. The four work groups were: Hazard Mitigation, Public Information and Community Education, Stormwater Management and Partnership and Resource group. The Stormwater Management group was responsible for the preparation of over 1,500 floodplain elevation certificates. The Public Information and Community Education and Partnership and Resource groups met with community organization, civic groups, businesses and the general public to promote hazard mitigation activities. The Land Use group focused on the how local plans and ordinances relate to hazard mitigation and published Hazard Mitigation through Land Use Planning in 2001. The Hazard Mitigation group addressed flooding, wildfire, meteorological events, and hazardous materials incidents in its report Hazard Analysis.

## City of Roanoke Mitigation Goals and Strategies

In developing mitigation strategies for the region and each locality, a wide range of activities were considered in order to achieve the goals and to lessen the vulnerability of the area to the impact of natural hazards. **All goals are dependant on the availability and timeliness of non-local funding.**

Goals and Strategies were prioritized by each locality. Prioritization was completed in order of relative priority – high, medium or low – based on the benefit to cost criteria and the strategy’s potential to mitigate the impact from natural hazards. Consideration was also given to availability of funding, the department/agency responsible for implementation, and the ability of the locality to implement the project. Under each identified pre-disaster, applicable local government departments will be the lead in making sure that each project or action will be implemented in a timely manner with other departments, other Roanoke Valley governments representatives and/or other regional agencies.

The anticipated level of cost effectiveness of each measure was a primary consideration when developing the list of proposed projects. Since the mitigation projects are an investment of public funds to reduce damages, localities have selected and prioritized projects based on the benefit to cost of each project in hopes of obtaining the maximum benefit. Projects were categorized as high, medium or low benefit to cost based on the available information for each proposed project. Reduced damages over the lifespan of the projects, the benefits, are likely to be greater than the project cost in all cases. Although detailed cost and benefit analysis was not conducted during the mitigation action development process, these factors were of primary concern when prioritizing and selecting the proposed projects.

### **Flooding**

Goal: Mitigation of loss of life and property from flooding and flood related disasters.

Responsible Department(s): Engineering, Emergency Management

Strategies:

1. In cooperation with local governments, support a comprehensive public information and education program on flooding, living in the floodplain, flood risks, low cost simple flood mitigation measures, flood insurance, stream remediation, hydrology, floodplain ordinances, and NFIP. This can be accomplished through regional workshops and educational materials for citizens, business, local staff, and elected officials.

2. Develop and maintain an inventory of flood prone roadways in cooperation with the Virginia Department of Transportation.
3. Develop and maintain an inventory of flood prone critical facilities such as hospitals, public utility sites, airports, etc.
4. Participate in The Community Rating System.

Goal: Update existing GIS data layers related to natural hazards.

Responsible Department(s): Engineering, Department of Technology

Strategies:

1. Consider seeking funding and support programs that update FEMA's Flood Insurance Rate Maps (FIRM). Consider participation in FEMA's Cooperating Technical Partners (CTP) program that establishes partners with local jurisdictions to develop and maintain up-to-date flood maps.
2. Utilize GIS to inventory at risk infrastructure and public and private structures within flood prone areas.
3. Participate in FEMA's Digital Flood Insurance Rate Maps (DFIRM) program.
4. Support FIRM remapping projects that address areas in the region that have the most serious mapping problems and where flooding is a repetitive problem.

Goal: Provide early warning of flooding.

Responsible Department(s): Emergency Management

Strategies:

1. Identify areas with recurring flood problems and request additional IFLOW stream/rain gauges as appropriate to ensure that these areas are adequately covered and monitored.
2. Identify areas with recurring flood problems and incorporate the addresses and phone numbers into an early warning database, specifically the Reverse 911 system

Goal: Identification of structural projects that could mitigate the impact of flooding.

Responsible Department(s): Engineering

Strategies:

1. Consider seeking funding to prepare site-specific hydrologic and hydraulic studies that look at areas that have chronic and repetitive flooding problems.

2. Support Virginia Department of Transportation projects that call for improved ditching, replacement of inadequate and undersized culverts, enlargements of bridge openings and drainage piping needed to minimize flooding.

### **All Hazards**

Goal: Provide early warning for terrorism events and natural disasters and emergencies.

Responsible Department(s): Emergency Management

Strategies:

1. Purchase and maintain the Reverse 911 system. Funding annual maintenance and upgrade costs. Identify likely targets and develop call out list for quick activation. Identify flood prone areas and incorporate those numbers in a flood notification database.
2. In cooperation with VDEM, FEMA, the Red Cross and other localities support a comprehensive public information and education program dealing with citizen preparedness for acts of terrorism as well as man made disasters.

Goal: Improved communications Interoperability.

Responsible Department(s): Department of Technology

Strategies:

1. Seek funding to develop an interoperable radio communications system for the region

**City of Roanoke Hazard Mitigation Projects in Need of State and Federal Assistance**

<b>Project</b>	<b>Hazard Mitigated Goal#</b>	<b>Benefit</b>	<b>Cost</b>	<b>Benefit-to-Cost</b>	<b>Priority</b>	<b>Funding Partners</b>	<b>Implementation/Lead Agency</b>	<b>Proposed Schedule</b>
Reverse 911	All Hazards	Reduced loss of life and property through improved warning system.	\$50,000	High	High	FEMA, VDEM, Local Government	Local Government	1 year and ongoing
Communication Equipment Interoperability	All Hazards	Improved response times through improved coordination among jurisdictions.	Unknown	Unknown	High	FEMA, VDEM, Local Government	Local government	Ongoing
Structure acquisition – residential units	Flooding	Removal of households from flood hazard areas; reduce repetitive loss; reduce loss of life and property.	\$500,000 per year	High	High	FEMA, VDEM, Local Government	Local government	2006 and ongoing
Public Education	All Hazards	Inform public about hazards and mitigation options	\$50,000	Medium	Medium	FEMA, VDEM, Local Government	Local government	Ongoing
Flood Hazard mapping update / modernization	Flooding	Increased accuracy of flood maps and more effective	\$100,000	High	High	FEMA, VDEM	Local government	2006-2007

		regulation and enforcement of regulations						
Additional Hazard related GIS layers / data	All hazards	Increased accuracy of hazard mitigation planning.	\$100,000	High	Medium	USGS, NOAA, FEMA, VDEM, VDOT	Local government	Ongoing
Upgrade / repairs to storm water system	Flooding	Reduce frequency and impact of flooding	\$57,000,000	High	High	FEMA, VDEM, Local government	Local government	Ongoing
Drainage System Maintenance	Flooding	Clear debris and repair banks to prevent backup, erosion and flooding of existing drainage systems.	\$500,000	High	High	FEMA, VDEM, Local government	Local government	Annually
Update Regional Storm Water Management Master Plan	Flooding	Watershed / mitigation planning and project identification	\$750,000	High	High	FEMA, Local government, PDC	Local government	2008